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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/711,923	10/13/2004	Liang Tang	137291XT (GEMS0218PA)	5922
61604	7590	03/02/2007	EXAMINER	
PETER VOGEL			ARTMAN, THOMAS R	
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WAUKESHA, WI 53188			PAPER NUMBER	
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SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
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Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/711,923

Applicant(s)

TANG, LIANG

Examiner

Thomas R. Artman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20 is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 7 and 9-19 is/are rejected.
- 7) ☒ Claim(s) 5 and 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 9, 11, 12, 14 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamashita (US 6,541,927 B2).

Regarding claim 1, Yamashita discloses a cathode circuit for an imaging tube (Fig. 1), including:

- a) a plurality of high voltage elements (12 and “Kr”) and
- b) at least one voltage clamping device (13r) coupled between the plurality of high voltage elements and preventing occurrence of overvoltage transients in the cathode circuit (col.5, lines 15-28).

With respect to claim 2, Yamashita further discloses that the plurality of high voltage elements have a low operating voltage therebetween (clamping circuit maintains voltage below a threshold; thus, Kr and the output terminal of item 12 are at substantially the same voltage).

With respect to claim 9, Yamashita further discloses that the voltage clamping device is a voltage clamping device (col.5, lines 15-28).

Regarding claim 11, Yamashita discloses an imaging tube (Fig.1), including:

- a) a plurality of high voltage elements (cables between 12 and 13r, and between 13r and Kr), and
- b) at least one voltage clamping device 13r coupled between the plurality of high voltage elements and preventing occurrence of overvoltage transients in the imaging tube (col.5, lines 15-28).

With respect to claim 12, Yamashita further discloses:

- c) a driving circuit 12, and
- d) a cathode Kr coupled to to the driving circuit via the plurality of high voltage elements (Fig.1).

With respect to claim 14, Yamashita further shows that the plurality of voltage elements exist within at least one of the imaging tube housing, casing, cable assembly and cathode (Fig.1).

With respect to claim 15, Yamashita further discloses that the plurality of high voltage elements are a plurality of high voltage leads (between 12 and 13r, and between 13r and Kr).

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Claims 1, 2, 6, 7 and 9-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Tanaka (US 4,995,069).

Regarding claim 1, Tanaka discloses a cathode circuit for an imaging tube (Figs.3, 5 and 8), including:

- a) a plurality of high voltage elements 20b, 23, and
- b) at least one voltage clamping device 72b coupled between the plurality of high voltage elements and preventing occurrence of overvoltage transients in the cathode circuit (col.5, lines 52-62).

With respect to claim 2, Tanaka further discloses that the plurality of high voltage elements have a low operating voltage therebetween (the driving circuit 20b directly applies the voltage to cathode 23; col.5, lines 57-62).

With respect to claim 6, Tanaka further discloses that the voltage device is a resistive jumper (Fig.8).

With respect to claim 7, Tanaka further discloses that the voltage clamping device is made of a resistive material (resistor 72b).

With respect to claim 9, Tanaka further discloses that the voltage clamping device is a voltage clamping device or current clamping device (col.5, lines 52-62).

With respect to claim 10, Tanaka further discloses that the voltage clamping device performs as an insulator when the voltage potential between the plurality of high voltage elements is less than a predetermined differential voltage (current flows freely past resistor 72b via short between lead 66 and cathode 23 below a predetermined differential voltage, where current flows through resistor 72b when a predetermined differential voltage is exceeded; col.5, lines 52-62).

Regarding claim 11, Tanaka discloses an imaging tube (Figs.5 and 8), including:

- a) a plurality of high voltage elements (cables between 20b and 72b and between 72b and 23), and
- b) at least one voltage clamping device coupled between the plurality of high voltage elements and preventing occurrence of overvoltage transients in the imaging tube (col.5, lines 52-62).

With respect to claim 12, Tanaka further discloses a driving circuit 20b and a cathode 23 coupled to the driving circuit via the plurality of high voltage elements (Figs.5 and 8).

With respect to claim 13, Tanaka further discloses:

- c) a driving circuit 20b (Fig.5), and
- d) a high voltage receptacle (Fig.8, inherently provided in order to connect the cables from the driving circuit to the cathode through the vacuum envelope 21a) that is coupled to the driving circuit via the plurality of high voltage elements.

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With respect to claim 14, Tanaka further shows that the plurality of high voltage elements exist within at least one of the imaging tube housing, insert, casing and cable assembly (Fig.8).

With respect to claim 15, Tanaka further shows that the plurality of high voltage elements are a plurality of high voltage leads (cables between 20b and 72b and between 72b and 23).

With respect to claim 16, Tanaka further discloses that the voltage clamping device allows current flow between the plurality of high voltage leads when the voltage potential between the plurality of high voltage leads is greater than a predetermined voltage level (col.5, lines 52-62).

With respect to claim 17, Tanaka further discloses that the voltage clamping device is made of a resistive material (resistor 72b).

With respect to claim 18, Tanaka further discloses that the voltage clamping device performs as an insulator when the voltage potential between the plurality of high voltage elements is less than a predetermined differential voltage (current flows freely past resistor 72b via short between lead 66 and cathode 23 below a predetermined differential voltage, where current flows through resistor 72b when a predetermined differential voltage is exceeded; col.5, lines 52-62).

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Claims 1, 3, 4, 6, 7, 9-11 and 14-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Wirth (US 5,132,999).

Regarding claim 1, Wirth discloses a cathode circuit for an imaging tube (Fig.2), including:

- a) a plurality of high voltage elements (including items 48-53), and
- b) at least one voltage clamping device 58, 59 coupled between the plurality of high voltage elements and preventing occurrence of overvoltage transients in the cathode circuit (col.2, lines 50-53; col.4, lines 27-46; col.5, lines 10-35).

With respect to claims 3, 4 and 7, Wirth further discloses that the voltage clamping device is made of a resistive material, specifically, a metal oxide varistor (col.4, lines 43-46).

With respect to claim 6, Wirth further discloses that the voltage clamping device is a resistive jumper (Fig.2 and col.5, lines 10-24).

With respect to claim 9, Wirth further discloses that the voltage clamping device is a voltage clamping device or a current clamping device (see above citations).

With respect to claim 10, Wirth further discloses that the voltage clamping device performs as an insulator when voltage potential between the plurality of high voltage elements is less than a predetermined differential voltage level (see above citations).

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Regarding claim 11, Wirth discloses an imaging tube (Fig.2), including:

- a) a plurality of high voltage elements (leads connecting both ends of the voltage clamping device), and
- b) a voltage clamping device 58, 59 coupled between the plurality of high voltage elements and preventing occurrence of overvoltage transients in the imaging tube (col.2, lines 50-53; col.5, lines 10-35).

With respect to claim 14, Wirth further discloses that the plurality of high voltage elements exist within an imaging tube housing 55.

With respect to claim 15, Wirth further discloses that the plurality of high voltage elements are a plurality of high voltage leads (see part b of the rejection of claim 11).

With respect to claim 16, Wirth further discloses that the voltage clamping device allows current to flow between the plurality of high voltage leads when voltage potential between the plurality of high voltage leads is greater than a predetermined voltage level (col.2, lines 50-53; col.5, lines 10-35).

With respect to claim 17, Wirth further discloses that the voltage clamping device is made of a resistive material.

With respect to claim 18, Wirth further discloses that the voltage clamping device performs as an insulator when voltage potential between the plurality of high voltage elements is less than a predetermined differential voltage level (see above citations).

Claims 1, 6, 7, 9-11 and 15-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Titterton (US 2,524,240).

Regarding claim 1, Titterton discloses a cathode circuit for an imaging tube (Figure), including:

- a) a plurality of high voltage elements (22, 23, 40, 27, 41), and
- b) at least one voltage clamping device (resistor at top of Figure, not labeled) coupled between the plurality of high voltage elements and preventing occurrence of overvoltage transients in the cathode circuit (inherent in the function of the un-labeled resistor where tube discharge will take place rather than current flow through the resistor unless the applied voltage exceeds the resistive ability of the resistor and current starts to flow in the resistor).

With respect to claim 6, Titterton further shows that the voltage clamping device is a resistive jumper (symbol for resistor, Figure).

With respect to claim 7, Titterton further shows that the voltage clamping device is formed of a resistive material (symbol for resistor, Figure).

With respect to claim 9, Titterton further shows that the voltage clamping device is either a voltage clamping device or a current clamping device (Figure).

With respect to claim 10, it is inherent in the function of the un-labeled resistor of Titterton that the voltage clamping device performs as an insulator when the voltage potential between the plurality of high voltage elements is less than a predetermined differential voltage level (Figure, see explanation in rejection of claim 1).

Regarding claims 11 and 15, Titterton discloses an imaging tube (Figure), including:

a) a plurality of high voltage elements (high voltage leads between un-labeled resistor and items 22, 23, 40 and 27), and

b) a voltage clamping device coupled between the plurality of high voltage elements and preventing occurrence of overvoltage transients in the imaging tube (inherent in the function of the un-labeled resistor where tube discharge will take place rather than current flow through the resistor unless the applied voltage exceeds the resistive ability of the resistor and current starts to flow in the resistor).

With respect to claim 16, it is inherent in the function of the un-labeled resistor of Titterton that the voltage clamping device allows current to flow between the plurality of high voltage leads when voltage potential between the plurality of high voltage leads is greater than a predetermined voltage level (Figure, see explanation in rejection of claim 11).

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With respect to claim 17, Titterton further shows that the voltage clamping device is formed of a resistive material (symbol for resistor, Figure).

With respect to claim 18, it is inherent in the function of the un-labeled resistor of Titterton that the voltage clamping device performs as an insulator when voltage potential between the plurality of high voltage elements is less than a predetermined differential voltage level (Figure, see explanation in rejection of claim 11).

Regarding claim 19, Titterton discloses a cathode circuit (Figure) having a plurality of high voltage elements (35, 37, 39 and 40, for example) having at least one discharge gap with a predetermined width (col.3, line 66 through col.4, line 23), and discharging takes place across the gap when a voltage potential across the gap is greater than a predetermined voltage level (see above citation).

Allowable Subject Matter

Claim 20 is allowed for reasons as stated in the previous Office action, dated September 22nd, 2006.

Claims 5 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, as indicated in the previous Office action, dated September 22nd, 2006.

Response to Arguments

Applicant's arguments with respect to claims 1, 11 and 19 have been considered but are moot in view of the new ground(s) of rejection.

Specifically, the examiner agrees with Applicants' arguments that the devices indicated in the prior art with respect to the 35 USC 102(b) rejections of claims 1 and 11 made in the previous Office action, dated September 22nd, 2006, do not necessarily perform the function of preventing overvoltage transients in the cathode circuits.

Furthermore, the examiner agrees that the circuit in Boyer, with respect to the 35 USC 102(b) rejection of claim 19, is not a cathode circuit. The Marx generator feeds the resulting voltage discharged from the gaps G1-G10 to the anode, rather than the cathode. The X-ray system of Boyer operates under the field emission concept, where the cathode is simply grounded and does not have an associated circuit.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Saturtun (US 4,601,051) teaches the use of clamping circuits in order to protect low-voltage feedback loop circuitry. Smits (US 4,638,500) teaches a clamping circuit in a low-voltage feedback loop.

Reinhold (US 4,899,354) teaches an insulative element 6, Fig.1, that matches most of the structural requirements of the claimed invention, including claim 5. However, there is no teaching nor suggestion in the prior art of record that element 6

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prevents the occurrence of overvoltage transients in the cathode circuit (between the cathode leads 2 and 3), or a need for such a function in that position.

Smith (US 1,647,478) and Splain⁸⁷⁷ teach the use of spark gap elements in order to reduce overvoltage transients in a cathode circuit.

Courtois (US 3,643,094) teaches the use of a spark gap element to drive a cathode circuit.

Qian (US 6,507,174 B1) and Moisin (US 2002/0030451 A1) teach voltage-clamping circuits for preventing overvoltage transients in high voltage applications.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas R. Artman whose telephone number is (571) 272-2485. The examiner can normally be reached on 9am - 5:30pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Thomas R. Artman
Patent Examiner